



Simulation of an HTS Synchronous Superconducting Generator

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Simulation of a HTS Synchronous Superconducting Generator

Victor M.R. Zermeno

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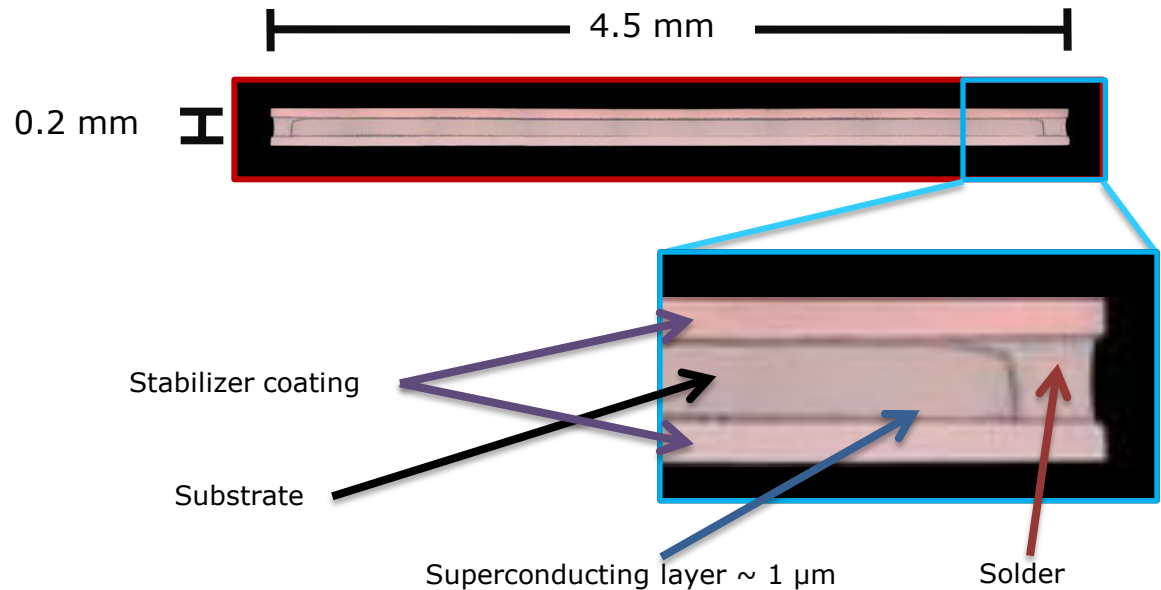
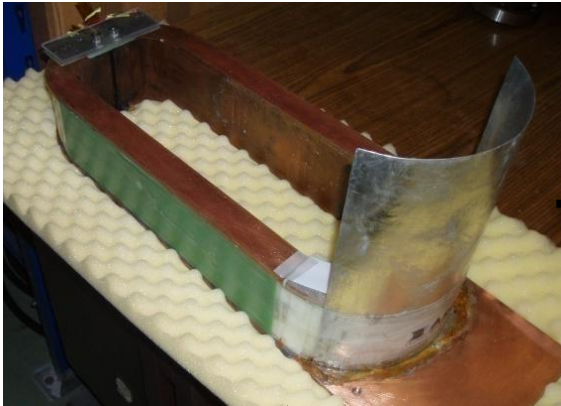
Nenad Mijatovic

Mads Peter Sorensen

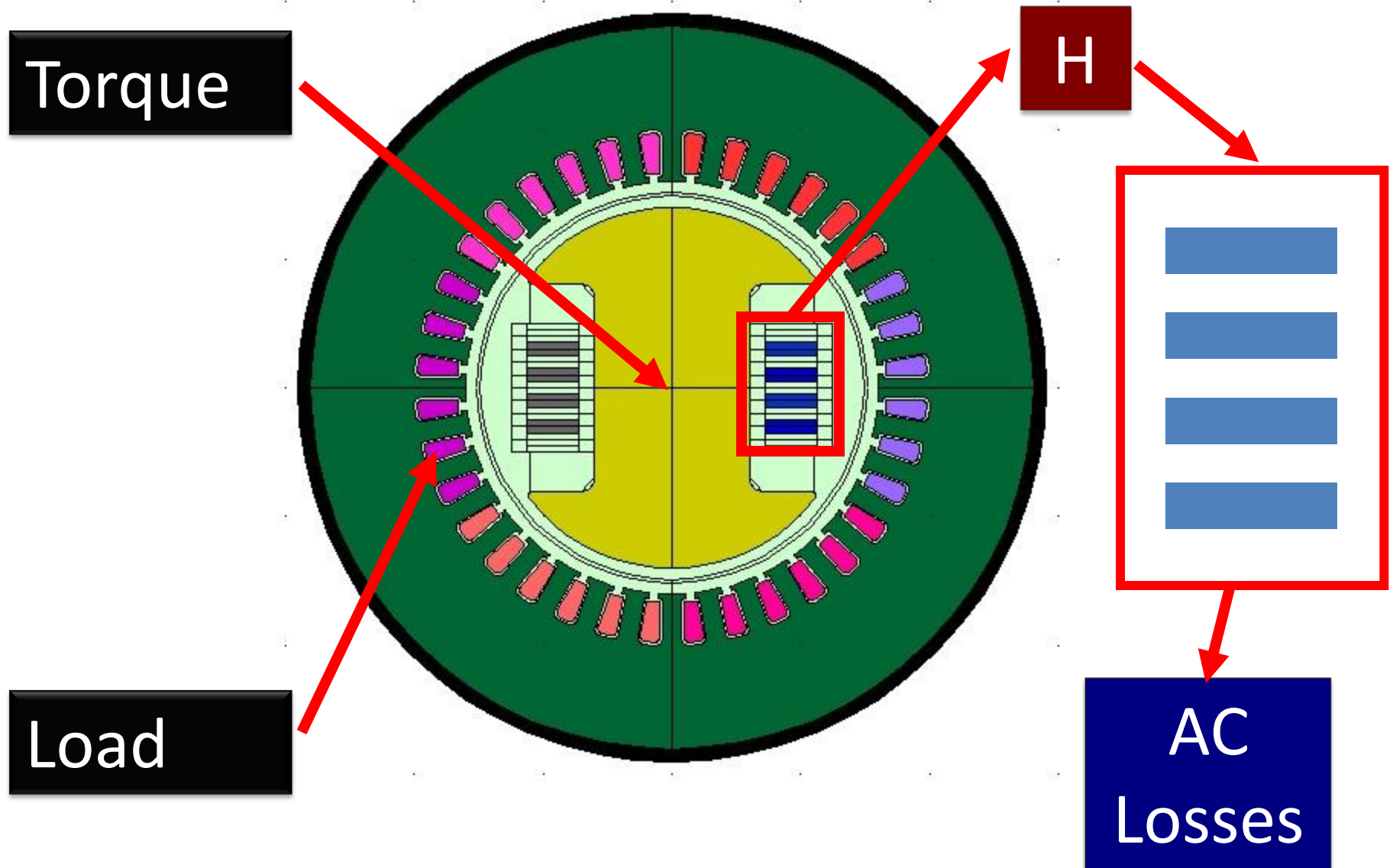
Bogi B. Jensen

Niels F. Pedersen

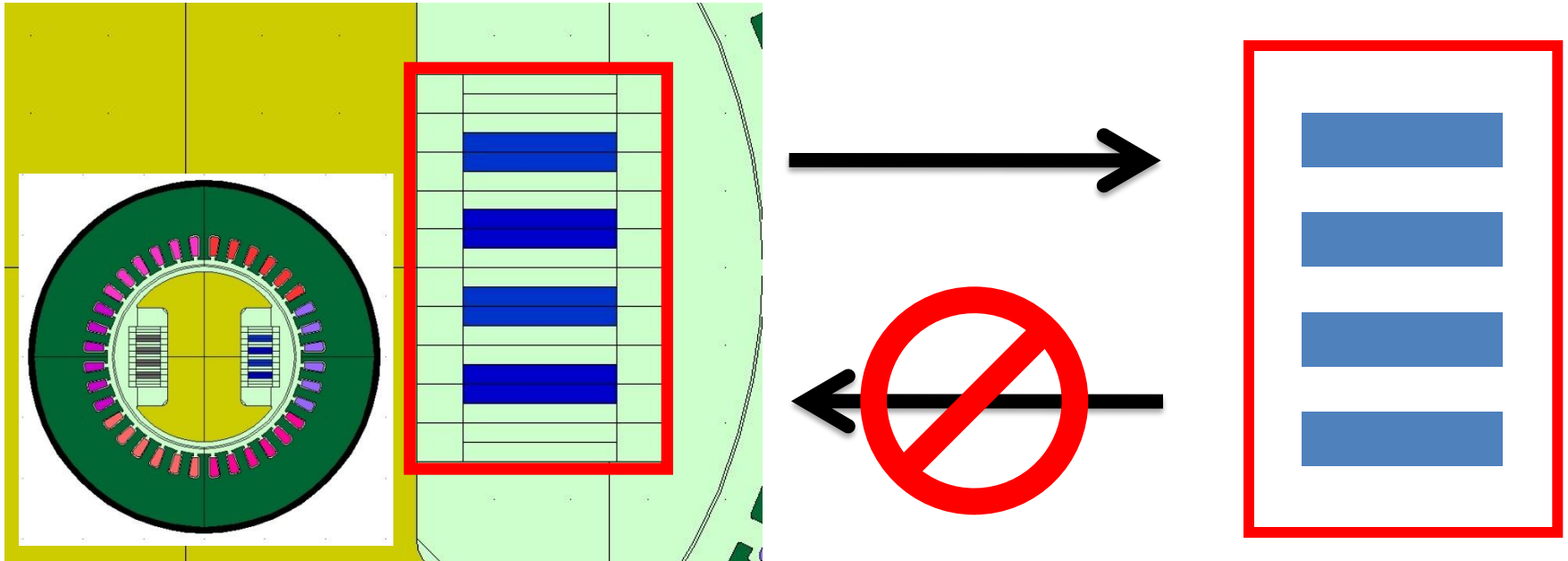
Multiscale Setup



Strategy for Simulation

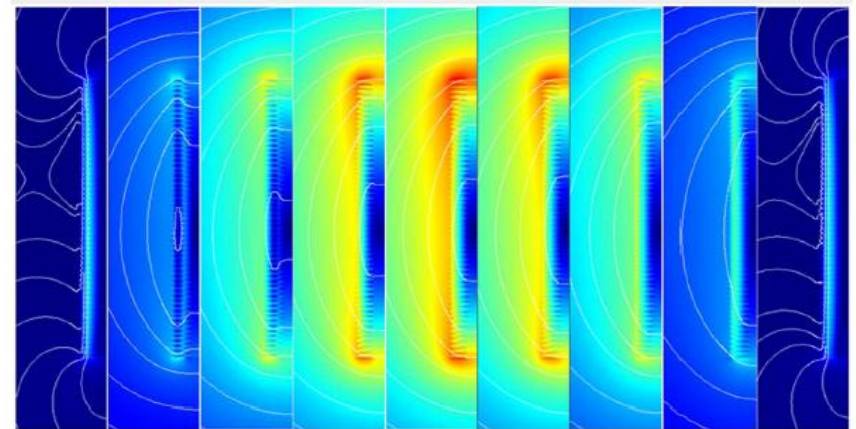
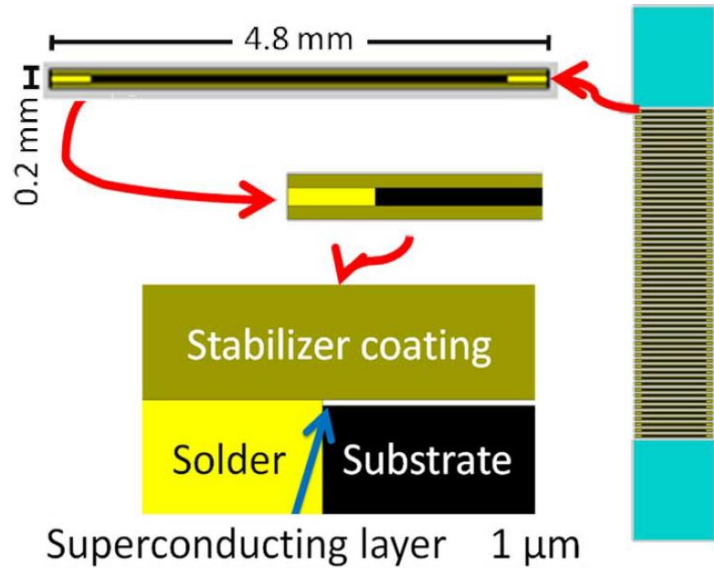
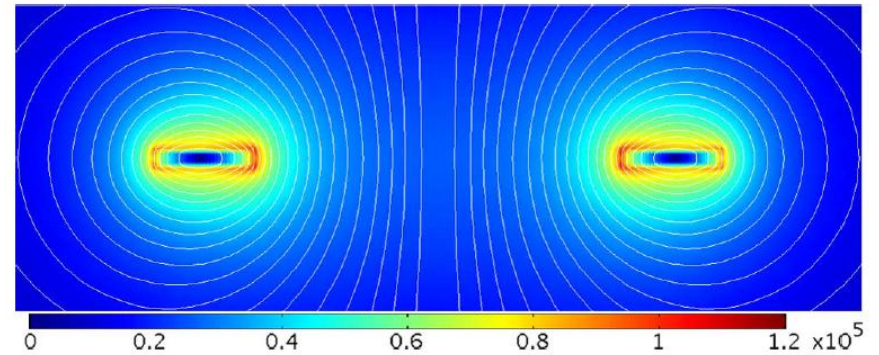
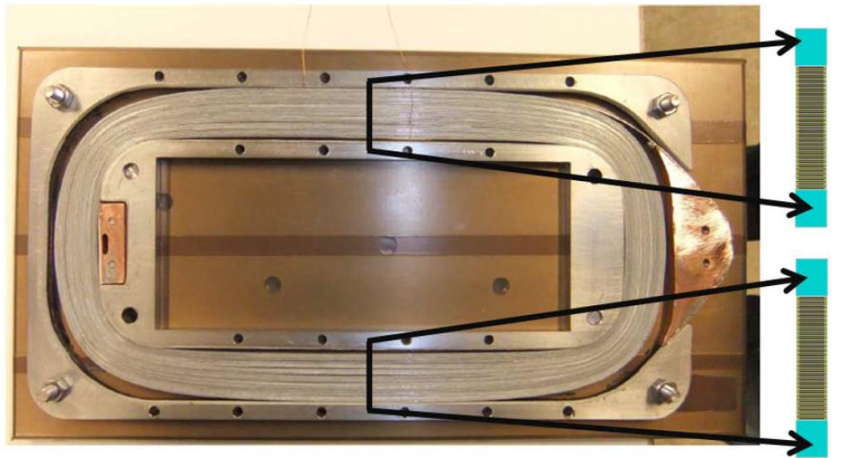


Main Assumption



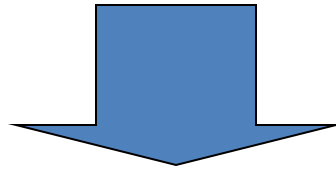
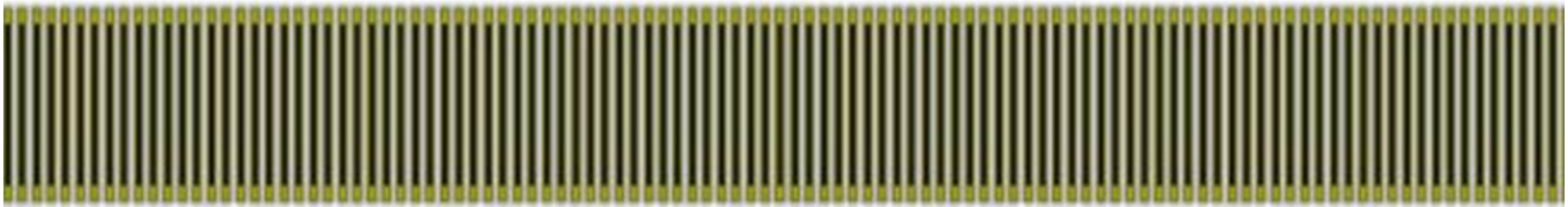
The current distribution in the coils' tapes does not affect the Magnetic Field at the coupling boundary

Previous work



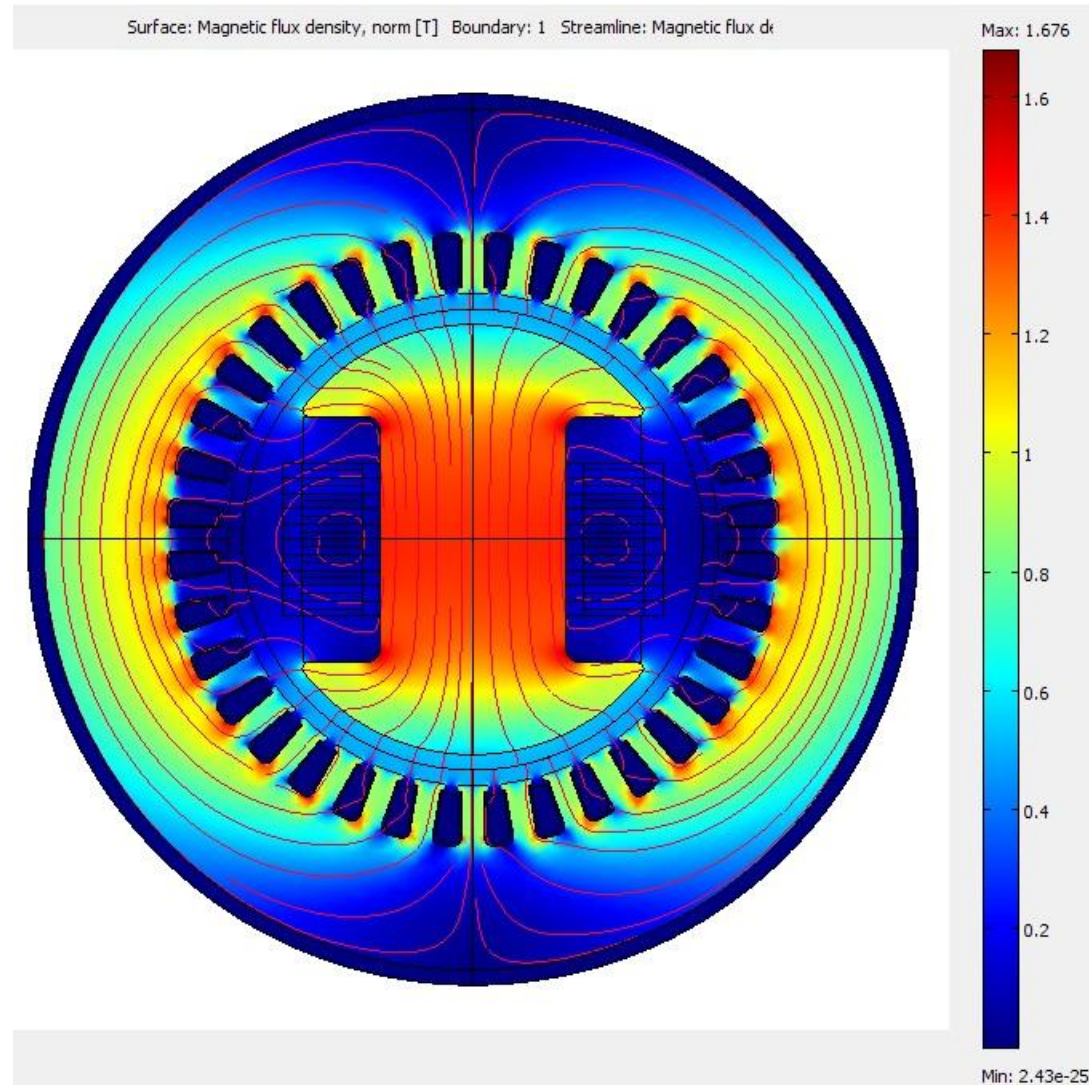
“Homogenization”

$$I_k = \int_{C_k} J_z dS$$

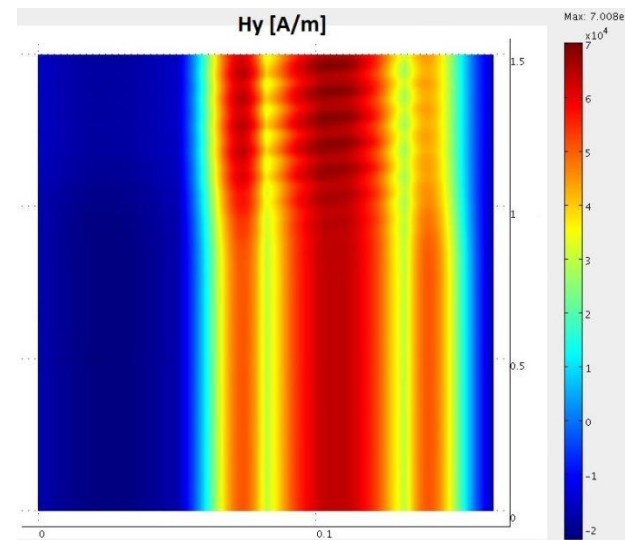
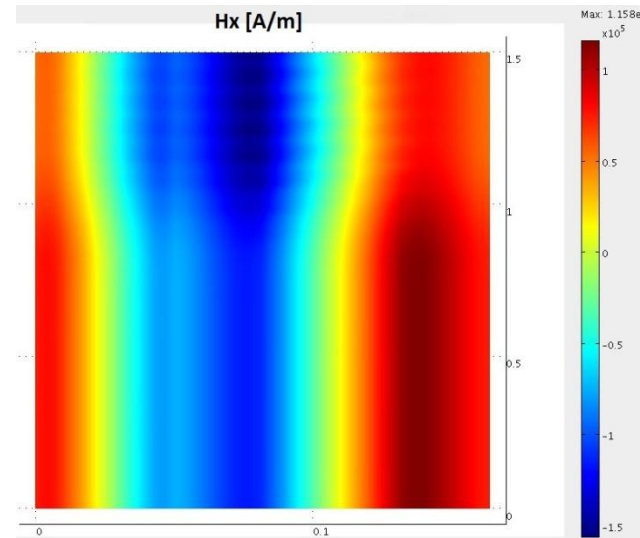
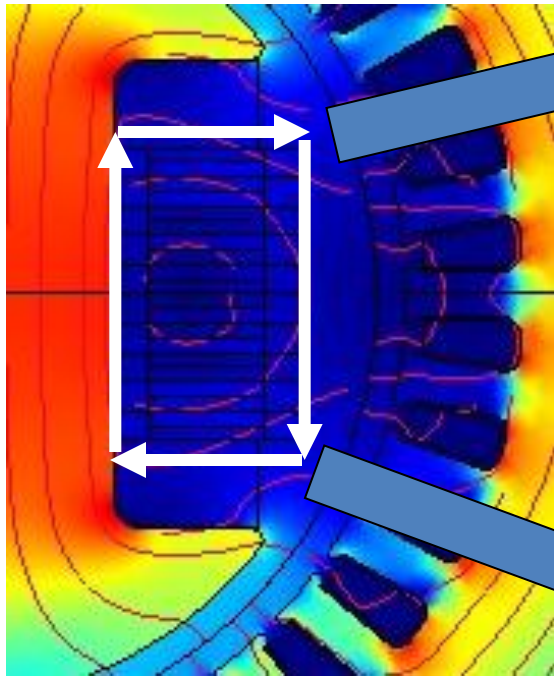


$$K(x) = \int J(x, y) dy$$

Generator



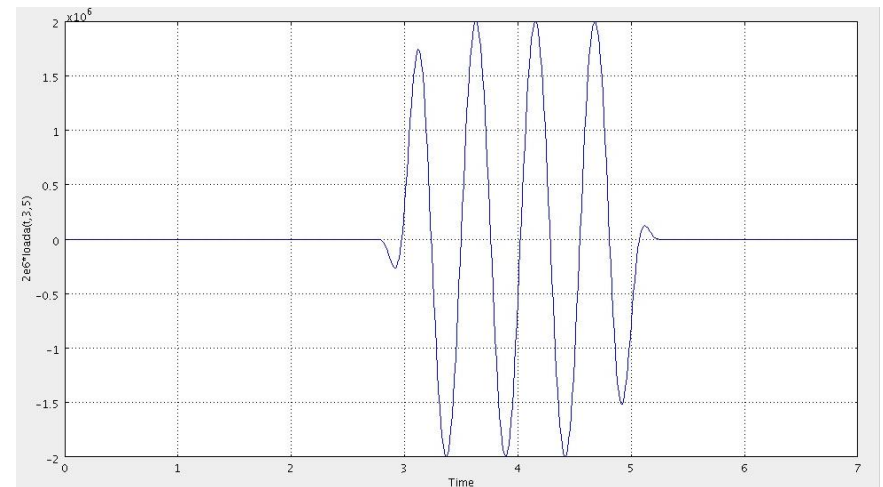
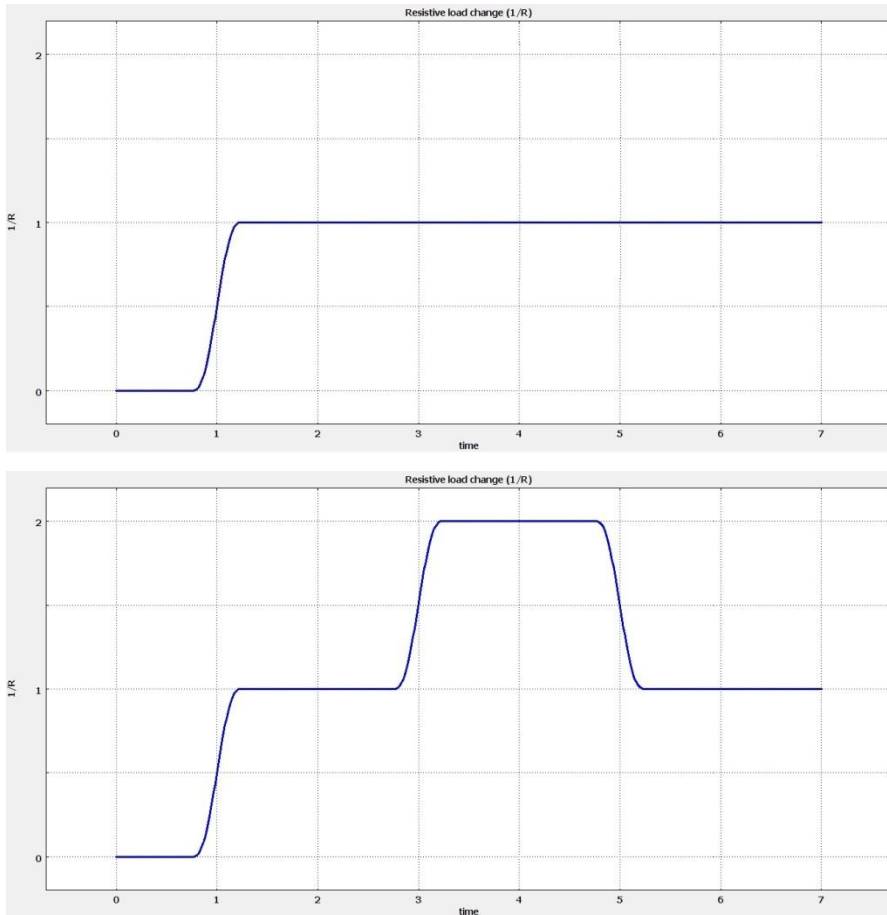
Coupling



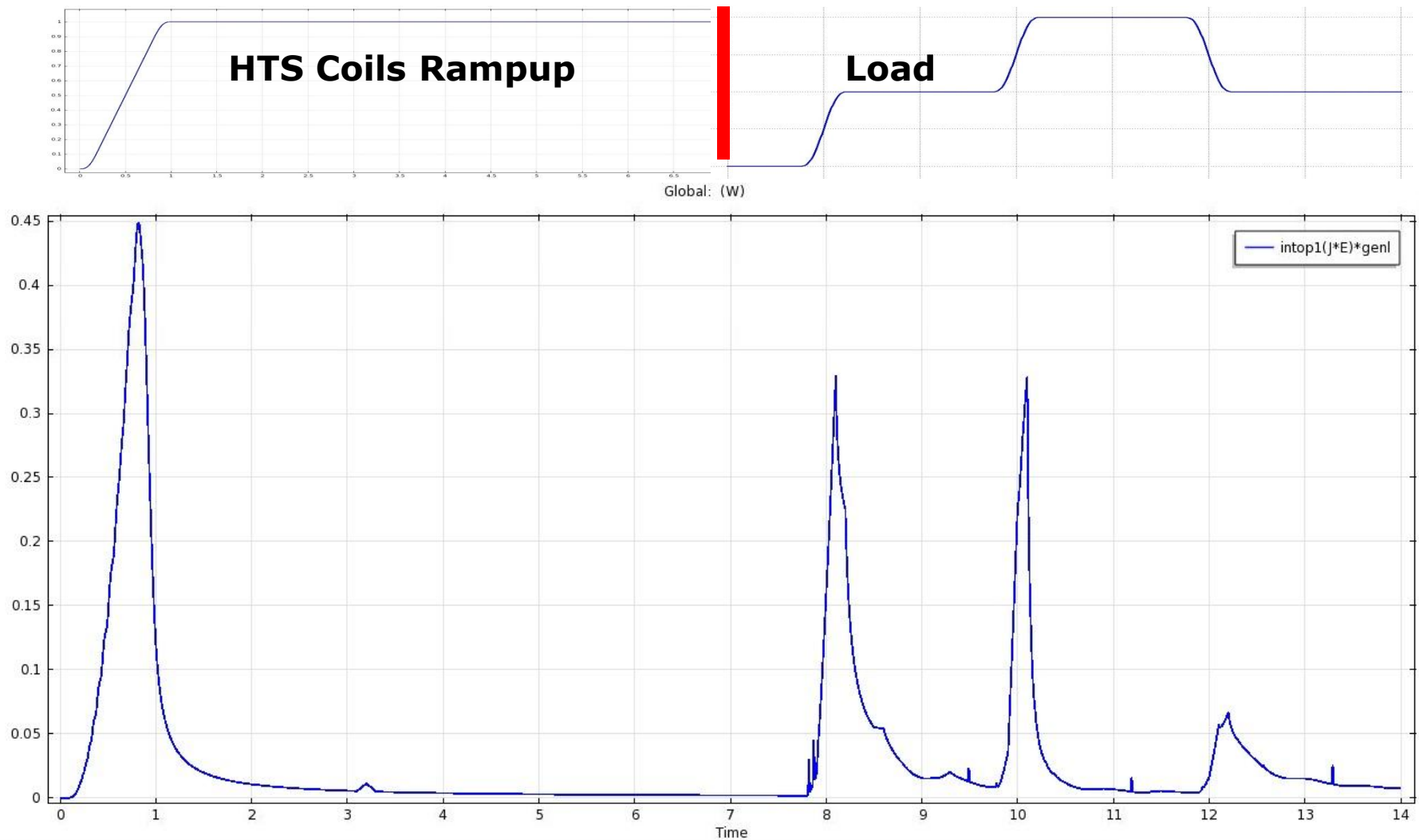
Loads

Passive

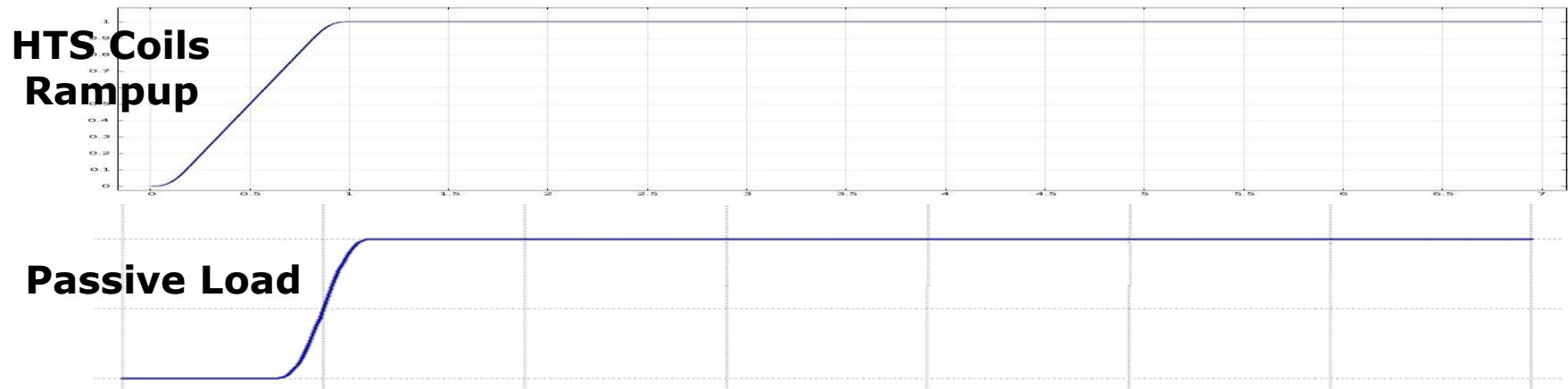
Active



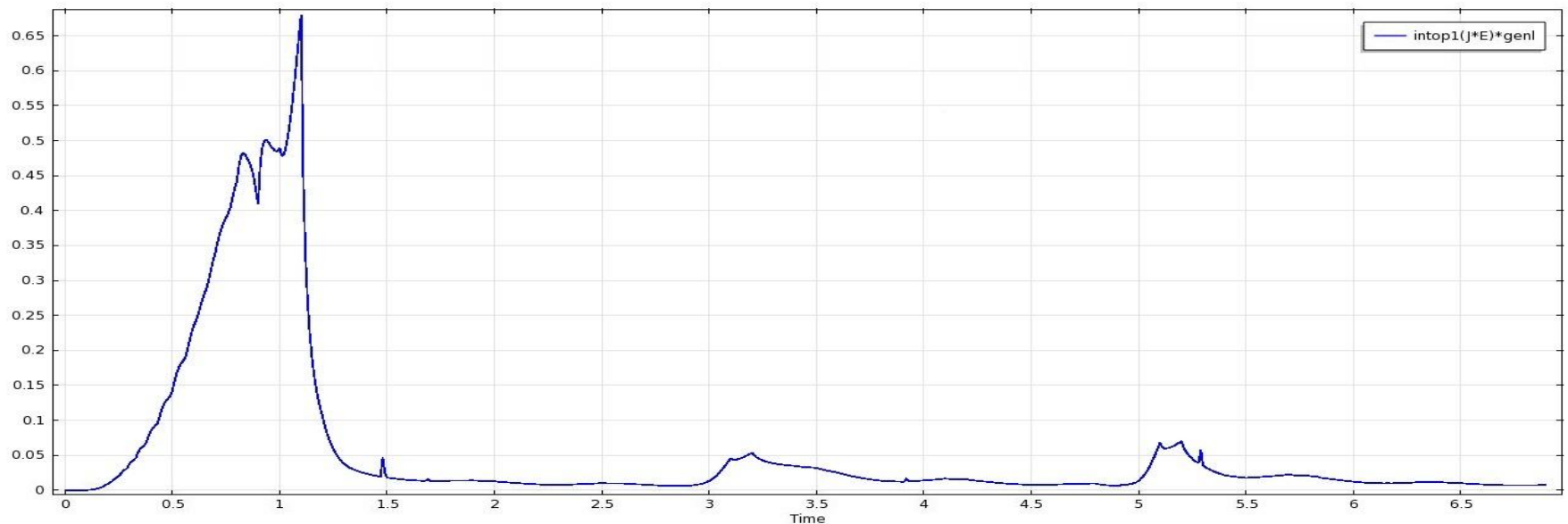
Losses under load change



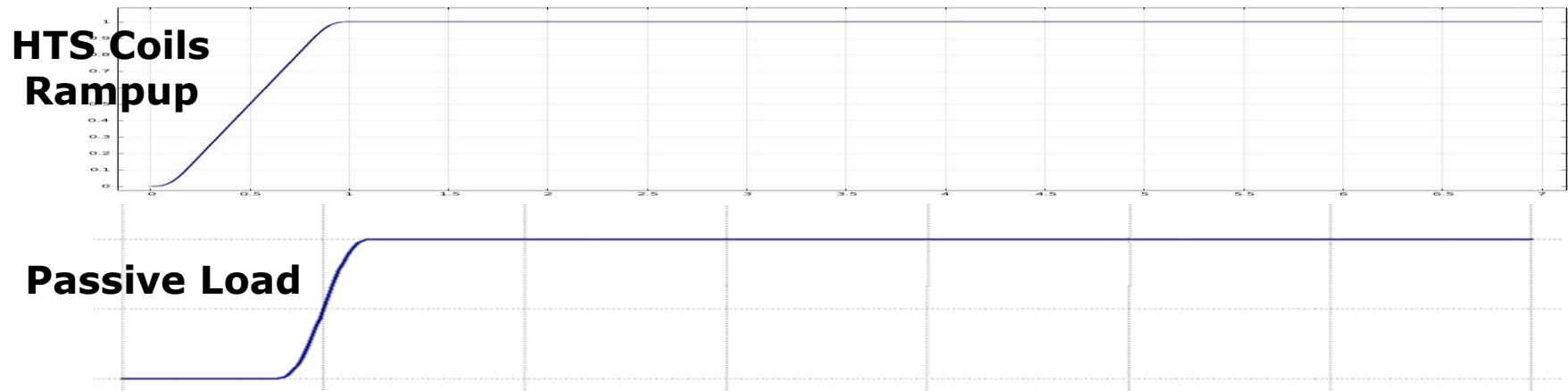
Losses under passive+active load



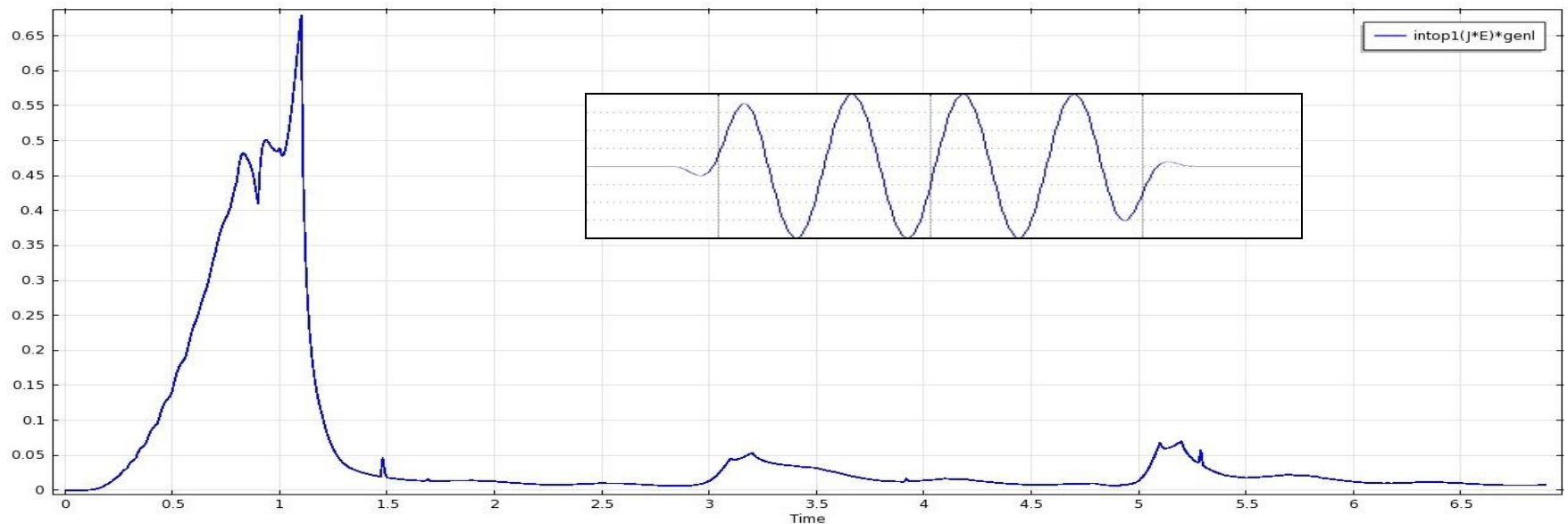
Global: (W)



Losses under passive+active load

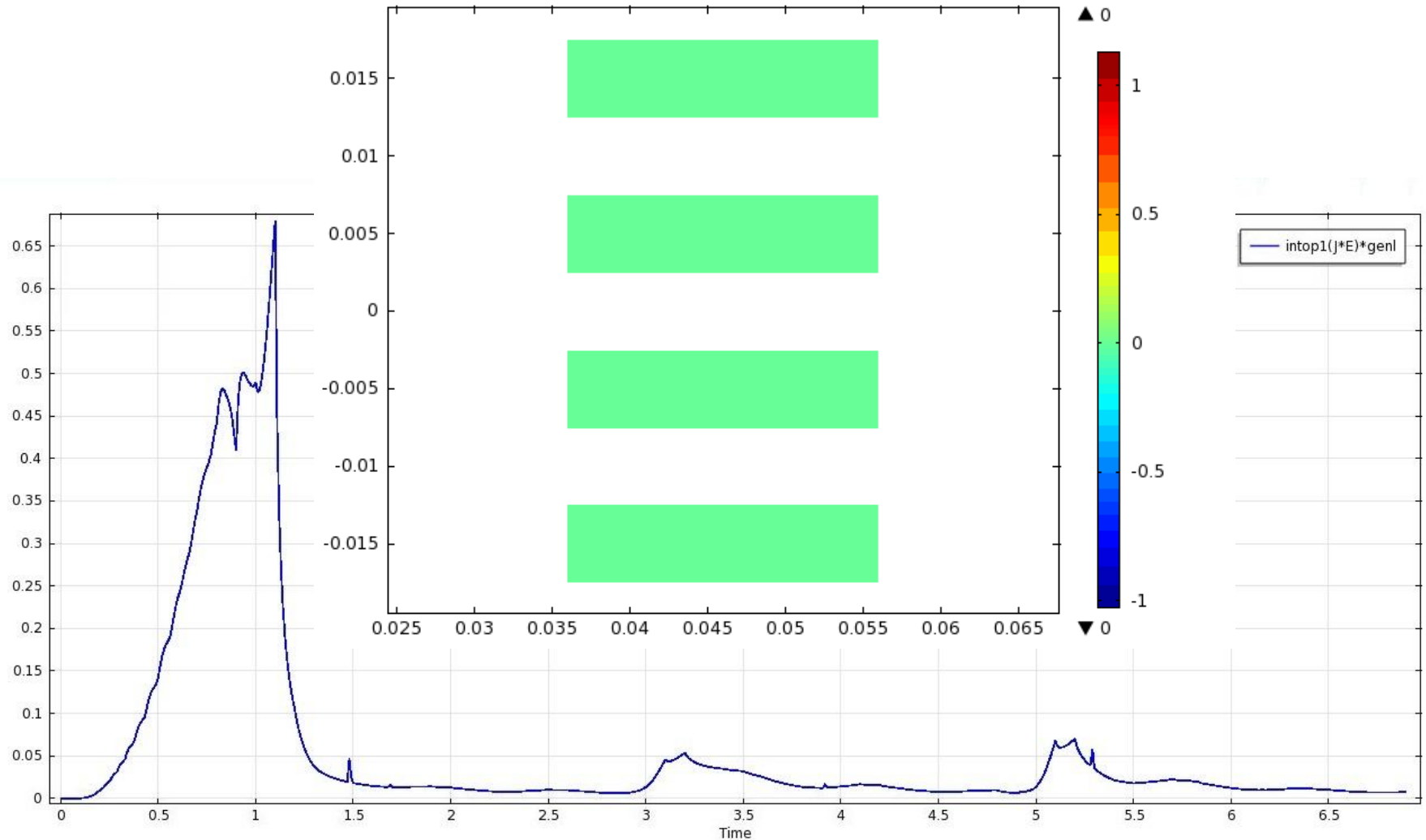


Global: (W)



Current Density

Time=0 Surface: J/J_c (1)



Thank You !